

REMARKS

Applicant requests favorable reconsideration and allowance of the subject application in view of the preceding amendments and the following remarks.

Claims 1, 4-7, 9, 11, 12 and 14-18 are presented for consideration. Claims 1, 6, 9 and 14-18 are independent.

Without conceding the propriety of the rejections set forth in the above-noted Office Action and solely to advance prosecution, Applicant has amended claims 1, 12 and 15 to clarify features of the subject invention. Specifically, the subject matter of claims 2 and 3 has been substantively incorporated into each of claims 1 and 15. Therefore, claims 2 and 3 have been canceled without prejudice or disclaimer. Also, the dependency of claim 12 has been corrected. Support for these changes can be found in the original application, as filed. Therefore, no new matter has been added.

Applicant notes with appreciation that claims 6, 7, 9, 14 and 16-18 have been indicated as being allowable. In addition to these claims being allowable, Applicant submits that independent claims 1 and 15 patentably define features of the subject invention.

Applicant requests favorable reconsideration, withdrawal of the rejections set forth in the above-noted Office Action and early passage to issue of the present application.

Claim 12 was rejected under 35 U.S.C. §112, second paragraph, as being indefinite. The Examiner asserted that claim 12 merely duplicated features recited in independent claim 1. In light of the Examiner's comments, Applicant has changed the dependency of claim 12 from claim 1 to claim 6. Applicant submits that this change overcomes the rejection under 35 U.S.C. §112, second paragraph. Such favorable indication is requested.

Turning now to the art rejection, claims 1-5, 11, 12 and 15 were rejected under 35 U.S.C. §103 as being unpatentable over U.S. Patent No. 5,883,704 to Nishi et al. Applicant submits that this patent does not teach many features of the present invention, as previously recited in independent claims 1 and 15. Therefore, this rejection is respectfully traversed. Nevertheless, to expedite prosecution, Applicant has amended independent claims 1 and 15 to amplify the distinctions between the present invention and the cited art.

In one aspect of the invention, independent claim 1 recites an exposure apparatus while, in another aspect of the invention, independent claim 15 recites a device manufacturing method. These claims recite apparatus and method for illuminating an original with an F₂ excimer laser using an illumination optical system, projecting, using a projection optical system, a pattern of the original onto a substrate to be exposed to manufacture a device, replacing, using gas purging means, an inside space, which accommodates optical components of at least one of the illumination optical system and the projection optical system, with a dry gas, measuring, using a hygrometer disposed in the inside space, conditions in the inside space and producing an output, and controlling the dry gas replacement using the gas purging means, on the basis of the output of the hygrometer.

Accordingly, in the present invention, the inside space of the optical system can be purged by use of a dry gas, in accordance with an output of the hygrometer. Applicant submits that the cited art does not teach or suggest such features of the present invention, as recited in independent claims 1 and 15.

The Nishi et al. patent relates to a projection optical system of a projection exposure apparatus. The optical system has a plurality of optical members made of glass materials, at least one of which has a temperature characteristic of an index of refraction different from that of the

other glass material. A temperature control device controls a temperature of at least one of the optical members. Also, an imaging characteristic of the projection optical system is controlled to be a non-linear magnification or curvature of field. The temperature control device sets the temperature to be controlled to a variable target temperature determined in accordance with the imaging characteristic of the projection optical system. An exposing operation for transferring a mask pattern to a photosensitive substrate is started after the temperature of the optical member to be controlled reaches a predetermined allowable range of the target temperature.

The Nishi et al. patent also discusses issues relating to oxygen (O_2) and ozone (O_3). That patent, however, does not recognize the inconveniences caused by water content in an optical system. That patent, therefore, does not teach or suggest the use of a hygrometer inside an inside space, in the manner of the present invention recited in independent claims 1 and 15.

In addition, Applicant submits that one having ordinary skill in the art, based on the teachings of the Nishi et al. patent, might be inclined to place a sensor in that device. Applicant submits, however, that such a sensor would be just an oxygen concentration gauge. The Nishi et al. patent teaches nothing regarding using a hygrometer inside an inside space in order to control gas purging, in the manner of the present invention recited in independent claims 1 and 15. Therefore, that patent does not teach or suggest the salient features of Applicant's present invention, as recited in those claims.

For the foregoing reasons, Applicant submits that the present invention, as recited in independent claims 1 and 15, also is patentably defined over the cited art.


Dependent claims 4 and 5 also should be deemed allowable, in their own right, for defining other patentable features of the present invention in addition to those recited in independent claim 1. Further individual consideration of these dependent claims is requested.

Applicant further submits that this Amendment After Final Rejection clearly places this application in condition for allowance. This Amendment was not presented earlier because Applicant believed that the prior amendment placed the application in condition for allowance. Accordingly, entry of the instant Amendment, as an earnest attempt to advance prosecution and reduce the number of issues, is requested under 37 CFR 1.116.

Favorable reconsideration, withdrawal of the rejections set forth in the above-noted Office Action and an early Notice of Allowance are also requested.

Applicant's attorney may be reached in our Washington, D.C. office by telephone at (202) 530-1010. All correspondence should continue to be directed to our below-listed address.

Respectfully submitted,


Attorney for Applicant
Steven E. Warner
Registration No. 33,326

FITZPATRICK, CELLA, HARPER & SCINTO
30 Rockefeller Plaza
New York, New York 10112-3801
Facsimile: (212) 218-2200
SEW/srd

APPENDIX
VERSION WITH MARK-UPS TO SHOW CHANGES MADE

IN THE CLAIMS:

1. (Four Times Amended) An exposure apparatus, comprising:

an illumination optical system for illuminating an original with an F₂ excimer laser;

a projection optical system for projecting a pattern of the original onto a substrate to be exposed;

[and]

gas purging means for replacing an inside space, which accommodates optical components of at least one of said illumination optical system and said projection optical system, with a dry gas;

a hygrometer, disposed in the inside space, for measuring conditions in the inside space and for producing an output; and

a controller for controlling said gas purging means on the basis of the output of said hygrometer.

12. (Three Times Amended) An apparatus according to Claim [1] 6, further comprising a light source that includes an F₂ excimer laser.

15. (Three Times Amended) A device manufacturing method, comprising:

illuminating an original with an F₂ excimer laser using an illumination optical system;

projecting, using a projection optical system, a pattern of the original onto a substrate to be exposed to manufacture a device; [and]

replacing, using gas purging means, an inside space, which accommodates optical components of at least one of the illumination optical system and the projection optical system, with a dry gas;

measuring, using a hygrometer disposed in the inside space, conditions in the inside space and producing an output; and

controlling the dry gas replacement using the gas purging means, on the basis of the output of the hygrometer.